Historical Accuracy and Artistic Expression in 3D Digital Sculpting: Exploring Marcus Aurelius as Historical Representation

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Abstract. This practice-based research project investigates the relationship between historical accuracy and artistic expression in 3D digital sculpting, utilizing Marcus Aurelius as a case study. In order to generate insights into best practices and tactics for 3D digital sculpting as a form of historical representation, the project intends to construct a 3D digital sculpture of the emperor that strikes a compromise between accuracy and artistic expression. The sculpture will be made with a combination of 3D digital sculpting software, such as Zbrush and Blender, and historical study and visual references will guide the design process. This research project will analyze the trade-offs and choices that must be made in order to produce a digital sculpture that is both historically representative and artistically expressive, as well as any potential effects that these choices have on how historical figures are portrayed in art and design.

Keywords: 3D Digital, Sculpting, Historical Accuracy, Artistic Expression, Marcus Aurelius.

1　Introduction

In recent years, the application of 3D digital technologies has seen widespread use in various industries, particularly in concept design as mentioned by Alcaide-Marzal et al., [1]. History and archaeology have also harnessed the potential of these technologies to create digital representations of historical artifacts and figures. Techniques like 3D scanning, modeling, and sculpting have opened up new opportunities for reconstructing and visualizing the past as mentioned by Ferdani et al., [2]; Frank et al., [3]; Unver & Taylor [4]. Yet, even as these technologies advance, a significant challenge persists in the field of 3D digital sculpting across diverse media, including film and video games, striking the delicate balance between historical accuracy and artistic expression as mentioned by Shaw [5].

Motivated by the challenge of balancing historical accuracy with artistic expression, this practice-based exploration aims to develop a 3D visualization project featuring Marcus Aurelius, a pivotal historical figure of ancient Rome. As a powerful Roman Emperor and philosopher, Marcus Aurelius left an enduring legacy, with his influential

book, "Meditations," continuing to inspire thought and leadership through the paradox of blending leadership with deep self-reflection.

This project seeks to balance historical precision and artistic innovation in 3D digital sculpting. By analyzing how artistic choices impact the final historical representation, it enriches the understanding of the interplay between historical representation and art, offering valuable insights into the fields of art and design. Furthermore, this exploration offers an opportunity to address the challenges and benefits associated with employing 3D digital sculpting for historical representations, contributing to the ongoing dialogue surrounding historical accuracy and artistic ingenuity.

2   Methodology

This research embraces a practice-based approach, wherein knowledge is cultivated through practical application and iterative practice. Practice-based research, as expressed by Candy [6] is a process of obtaining new knowledge through practice, and the outcome results from that practice. Claims of the research's novelty are evident through creative output. In this research, the central focus lies in the ongoing creation of a 3D digital sculpture of Marcus Aurelius, which currently occupies the sculpting phase. This in a way, can be seen as an interdisciplinary project which involves two different disciplines, 3D visualization, and history. As stated by Leggett [7] Practice-based research is often used in collaboration projects as it benefits collaborators divided by disciplines and departments.

The choice of Marcus Aurelius as the subject of this 3D digital sculpting project is informed by his historical significance and the unique attributes that make him an ideal choice for exploration. As a Roman Emperor and philosopher, Marcus Aurelius's life and legacy offer a rich tapestry of historical context and philosophical depth, as mentioned by Crook [8]; Mark [9]. This selection allows for a multidimensional examination of historical representation and artistic expression. The foundation of this project lies in the collection of visual and textual references. An extensive search across online repositories, historical texts, and academic literature serves as a dataset. Visual references encompass depictions of Marcus Aurelius in sculptures, paintings, and other visual works such as film, ensuring a holistic understanding of his physical attributes and the artistic interpretations of his image over time, focuses on the early 170s when Marcus Aurelius was around 50 and in the process of writing Meditations as mentioned by Crook [10].

Textual references that can specifically explain the emperor's physical attribute is scarce. According to Knight [11] in his writings, tells that Marcus Aurelius is of Roman Italo-Hispanic origins The term "Italo-Hispanic" does not refer to a specific ethnic or racial group with a distinct physical appearance. Instead, it encompasses individuals of Italian and Hispanic (Spanish-speaking) backgrounds, which can vary widely in terms of physical features due to the diverse genetic and cultural backgrounds of both groups. Another thing that needs to be found out is the color of the emperor's eyes. In the literature search, there is no text that specifically mentions the color of Marcus Aurelius's eyes.

During the search for visual data, various AI reconstruction results attempting to visualize Marcus Aurelius in the real world were found (Figure 1). However, several examples showed significant differences, such as variations in skin color, complexion, hair, and facial hair. This illustrates the significant role of creativity and artistic expression in the process of visualizing historical figures whose exact appearances are unknown.

Fig. 1. Various AI reconstruction of Marcus Aurelius (Source : From left to right : https://www.stoicsimple.com/; https://twitter.com/ganbrood/status/1298281282707873794; https://www.instagram.com/p/CLDnKUbr1Nc/?igshid=MDJmNzVkMjY%3D&epik=dj0yJn U9VjdvYTdZZzZsaUswUUk5ZjJMYWlNXlLS2JJN25FWWgmcD0wJm49RG0xNWNEY W5XMUJubzRDczRFcFB0USZ0PUFBQUFBR1Q4bTZ3; https://static.boredpanda.com/blog/ wp-content/uploads/2020/08/17-5f3b83279353c_700.jpg.)

The lack of textual data providing detailed information about the physical attributes of this object is a challenge I have encountered in my previous research when attempting to develop a visual concept for historical content according to Kusumawardhani et al. [12], [13] and Aditya [14]. With this in mind, the visual references that are available from various forms have to be collected and observed as the basis of visual understanding in the process of the 3D digital sculpting process.

Fig. 2. Various Marcus Aurelius statues (Source: https://cdn.shortpixel.ai/spai/q_lossy+w_ 625+to_au-to+ret_img/www.stoicsimple.com/wp-content/uploads/2023/07/1000017299 1536x864.webp)

In parallel with the collection of visual references, a thorough study of Marcus Aurelius's life, reign, and philosophical contributions is undertaken. This step involves delving into historical accounts and philosophical works, with a focus on his writings in "Meditations" to grasp the nuances of his character, values, and intellectual pursuits. This comprehensive understanding informs the sculpting process, enabling a more nuanced portrayal of the subject.

The core of the project revolves around the application of 3D digital sculpting tools, including software such as ZBrush and Blender. These tools facilitate the translation of historical references and philosophical insights into a tangible digital form.
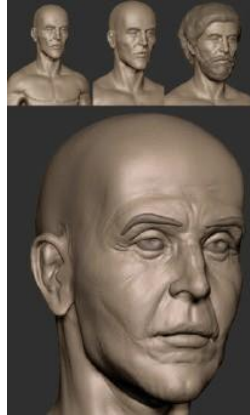

Fig. 3. 3D Digital Sculpting Process in Zbrush (Source: Personal documentation)

The sculpting process involves the creation of a bust 3D model that encapsulates the essence of Marcus Aurelius, aligning with the project's objective of achieving both historical representation and artistic expression (Figure 3). After completing the sculpting process up to the bust stage, the next step involves UV unwrapping to apply textures. Texture application to the skin of the 3D model is carried out in Adobe Substance Painter (Figure 4).

Fig. 4. Base Color texture (Source: personal documentation)

Armed with visual references such as photos of sculptures representing Marcus Aurelius and looking at various visual depictions, including his portrayal in the film "Gladiator" (2000), I attempted to gather relevant references for texturing. However, the film

portrayal proved less helpful because Marcus Aurelius is depicted in his later years, making the references less applicable (Figure 5).

Fig. 5. Richard Harris as Marcus Aurelius in the movie "Gladiator",Ridley Scott, Gladiator, 2000 (Source: https://static.wikia.nocookie.net/gladiator2000/imag- es/6/65/Marcus_Aurelius.jpg/re-vision/latest?cb=20101228231033)

After going through these stages in the process of creating a 3D digital sculpture, I heavily relied on my understanding of anatomy, facial expressions, and various principles of art. Artistic expression is undoubtedly an accumulation of my knowledge and under- standing as a practitioner, which significantly influences my decisions in shaping and visualizing Marcus Aurelius according to my interpretation. The foundation obtained from textual and visual data serves as the initial basis, but creative decisions are ultimately made by me as the creator of this work.

3   Result

This section will present the outcome of this practice-based exploration of the 3D digital sculpting process so far. My central aim is to strike a harmonious balance between historical accuracy and artistic expression. As we see in the result (Figure 6), The process of creating the 3D sculpting project has not yet reached the stage of adding hair and facial hair. However, the entire bust of the emperor has been completed up to the texturing and shading stage.

Fig. 6. Latest progress of 3D Digital Sculpting of Marcus Aurelius (Source: Personal documentation)

We can observe that the fundamental shape of the face, in general, draws heavily from references of sculptures depicting Marcus Aurelius (Figure 7). As far as the major facial features are concerned, including the smoothness of the forehead, the sharpness of the chin, the shape of the eyelids, and the width of the face, much of it is based on sculpture references. In other words, up to the major facial features, the digital sculpting process can still be conducted quite generally by emulating and heavily relying on the references.
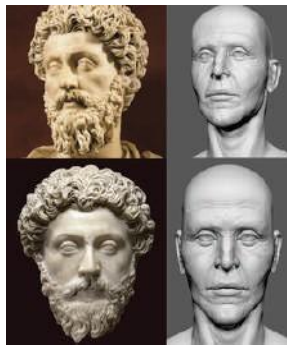

Fig. 7. Comparison of Statue and 3D Sculpt (Source: personal documentation)

Challenges begin to emerge as I venture into high-frequency details such as facial pores, wrinkles, and skin complexion. This is where our abilities as artists are put to the test. Our understanding of facial anatomy, body anatomy, as well as knowledge of facial expressions along with skin texture becomes crucial. Since many of the references are sculptures made of marble or bronze, complexion and skin details are not readily visible and can be challenging to grasp. Therefore, aside from our anatomical understanding, the need for references depicting facial wrinkles, skin complexion, and skin texture becomes crucial. Hence, I gathered several reference photos of individuals who share similarities in terms of ethnicity, age, and overall resemblance to Marcus Aurelius.

Artistic expression and creative choices are prominently evident in the texturing process of the model. Since we lack precise knowledge of Marcus Aurelius's skin color and complexion, I made the decision to give him a skin tone commonly associated with the Caucasian race. However, based on my understanding of Marcus Aurelius from various textual references and his self-reflective book "Meditations," I felt that despite being an emperor and potentially one of the most influential figures of his time, his virtues and high consciousness indicate that he was not someone focused on vanity. Therefore, the creative choice I made was to add some wrinkles that suggest he was a thinker and philosopher, someone not swayed by momentary euphoria. These creative decisions also influenced the expression depicted in this work; he appears neither smiling nor angry but rather calm and relax but, still decidedly serious.

Of course, since the visual creation process hasn't reached the stage of creating hair and facial hair yet, which will undoubtedly further influence the resemblance of this 3D sculpting to Marcus Aurelius. However, the hair creation process, which will be done in Blender, will attempt to refer to existing references. One anticipated challenge is that the depiction of the hair and facial hair of Marcus Aurelius in marble and bronze sculptures appears to show very thick hair strands (Figure 2). This is quite understandable given the dense material used for sculptures. This requires an understanding of the hair system in the 3D software Blender, which can truthfully visualize the hair and facial hair of Marcus Aurelius.

4   Discussion

In the field of creativity, it becomes imperative to comprehend the multifaceted mechanisms influencing the artistic choices inherent to the 3D sculpting process. Creativity, as proposed by Dietrich [15] unfolds through the interplay of various mechanisms, including the generation of novelty in both deliberate and spontaneous modes of thought, encompassing emotional and cognitive facets. This framework offers invaluable insights into the approach artists take when confronted with the challenge of harmonizing historical precision with artistic expression. Furthermore, it beckons the systematic exploration of variables such as knowledge, domain expertise, and age within the creative sphere.

The influence of artistic expression on creative decisions in visualizing historical figures is strikingly apparent, akin to character representation in video games, as noted by Bondioli et al., [16]. Within the gaming domain, a critical analysis of historical accuracy in character portrayal prevails. For instance, the representation of Cleopatra in the game 'Assassin's Creed Origins' adheres to recent studies and historical research, faithfully capturing her personality and traits. In stark contrast, Julius Caesar's character undergoes significant deviation from his well-documented historical persona.

As an artist, I consistently grappled with the task of generating innovative interpretations of Marcus Aurelius's visage while preserving historical authenticity. This highlights the significance of cognitive and emotional information, which substantially shaped the nuanced depiction of the subject. For instance, my choice to incorporate

subtle wrinkles on Marcus Aurelius's countenance was guided by the cognitive under-standing of his profound philosophy, emphasizing contemplation over the mere pursuit of power.

The examination of character representation in video games, including the alignment of portrayals with historical research, mirrors the artistic challenges I encountered in my 3D sculpting project. Bondioli et al., [16] resonates with the challenges I faced. This work highlights the need to critically assess the historical accuracy of character depictions. In the case of my project, I encountered similar considerations. While my sculpting drew heavily from historical references, I also had to navigate instances where historical information was scant, requiring creative decisions to fill the gaps. This approach aligns with the assertion that historical representation in the visual medium often involves a delicate balance between adherence to historical facts and creative interpretation.

5   Conclusion

In this practice-based research, I've delved into the process of reconstructing the visual appearance of historical figures from ancient times. Through this exploration, several crucial insights have come to light, providing a better understanding of the challenges and nuances associated with historical representation in our digital era. Foremost among these challenges is the scarcity of detailed textual descriptions that can provide a clear picture of the physical attributes and appearance of individuals from distant historical periods. This lack of precise information presents a significant hurdle when attempting to recreate their visual likeness. Furthermore, this exploration has revealed that even when drawing upon various forms of previously available visual art, such as sculptures and paintings, subtle variations in appearance persist. These differences, whether in hairstyle, facial hair, or fundamental facial features, underscore the subjective nature of artistic interpretation. Each artist brings a unique perspective to the portrayal of historical figures, resulting in a diverse array of artistic representations.

Technology, particularly 3D digital sculpting, has proven to be an invaluable tool for historical reconstruction. This technology empowers us to engage in the meticulous process of reconstructing iconic historical figures, such as the revered Roman Emperor in this project, with an unprecedented level of precision and detail. Artistic expression, as demonstrated in this research, is a product of accumulated experiences and knowledge. The influences and visual data available to an artist significantly shape the final outcome of their work, even when depicting real-life subjects. This is most evident in this project when adding intricate facial details, including wrinkles, which play a pivotal role in conveying the desired expression within the 3D sculpt.

This practice-based research underscores the challenges of historical representation and emphasizes the profound impact of artistic interpretation on our understanding of history. It reaffirms the critical role of technology in bridging the gap between the past and the present and underscores the transformative power of artistic expression in creating nuanced historical narratives.

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